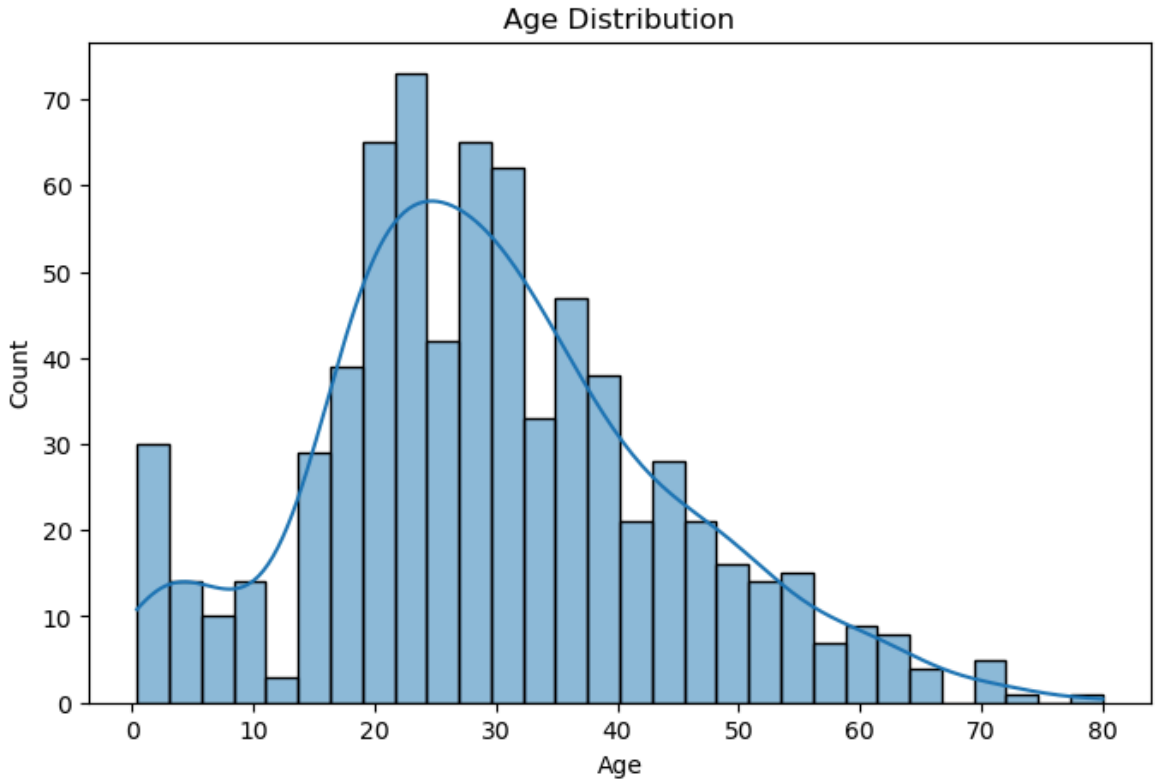
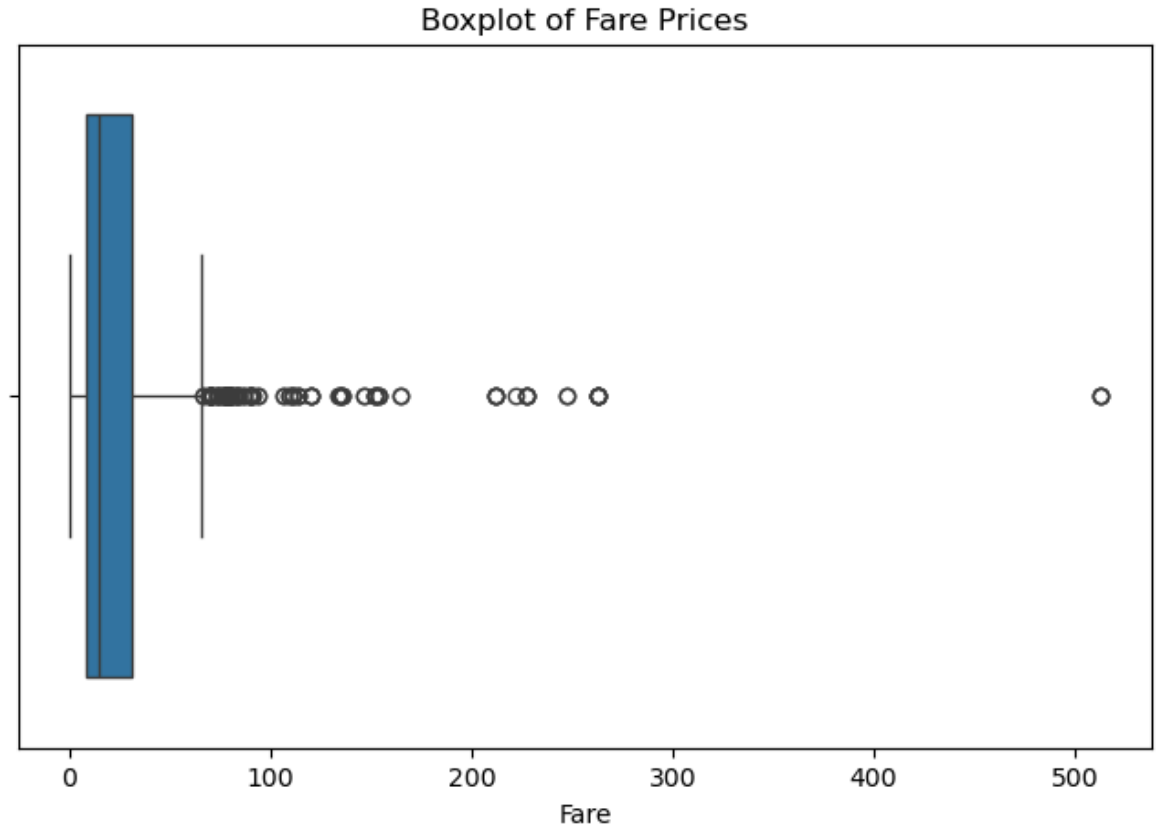
In [ ]:

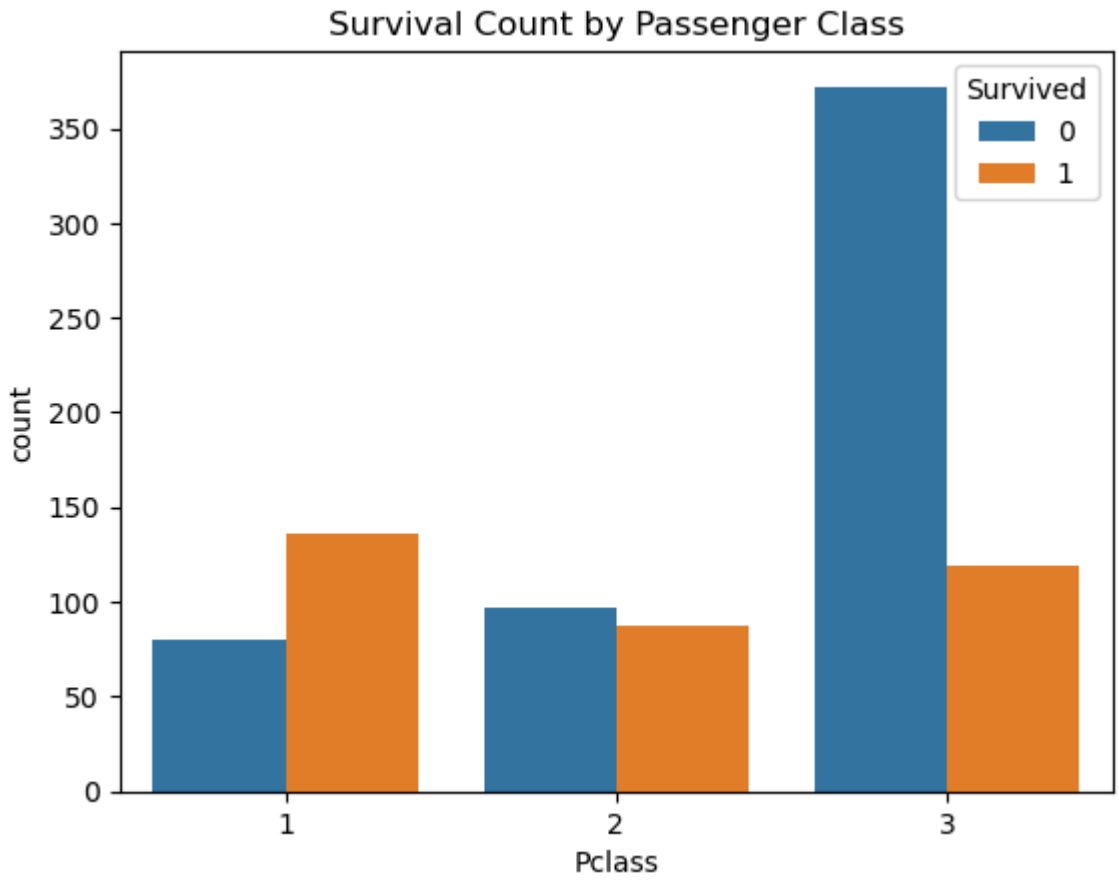
In [27]:
```
# Import libraries
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# Load dataset
df = pd.read_csv("train.csv")  # Change filename if needed

# Basic exploration
print(df.info())
print(df.describe())
print(df.isnull().sum())
print(df["Survived"].value_counts())

# Age Distribution Analysis
#- This histogram shows how age is distributed among passengers.
#- Observing the age range helps understand passenger demographics.

plt.figure(figsize=(8,5))
sns.histplot(df["Age"].dropna(), bins=30, kde=True)
plt.title("Age Distribution")
plt.show()

# Boxplot
plt.figure(figsize=(8,5))
sns.boxplot(x=df["Fare"])
plt.title("Boxplot of Fare Prices")
plt.show()

# Survival rate by class
# Survival Rate by Class
#- **First-class passengers had higher survival rates**, likely due to access to
#- **Third-class passengers had the lowest survival rates**, possibly because of
#- Passenger class (`Pclass`) is an **important predictor** of survival probabil

sns.countplot(x="Pclass", hue="Survived", data=df)
plt.title("Survival Count by Passenger Class")
plt.show()

# Select only numeric columns for correlation
df_numeric = df.select_dtypes(include=["number"])

# Verify numeric columns
print(df_numeric.head())  # Check if dataframe is correctly filtered

# Heatmap
plt.figure(figsize=(10,6))
sns.heatmap(df_numeric.corr(), annot=True, cmap="coolwarm", fmt=".2f")
plt.title("Feature Correlation Heatmap")
plt.show()

# Pairplot
sns.pairplot(df[["Survived", "Age", "Fare", "Pclass"]], hue="Survived")
plt.show()

# Summary of findings
```

```
observations = """
1. First-class passengers had higher survival rates.
2. Age and fare have a weak correlation.
3. Boxplots indicate outliers in fare prices.
4. Heatmap shows strong correlation between Pclass and Fare.
"""
print(observations)
```

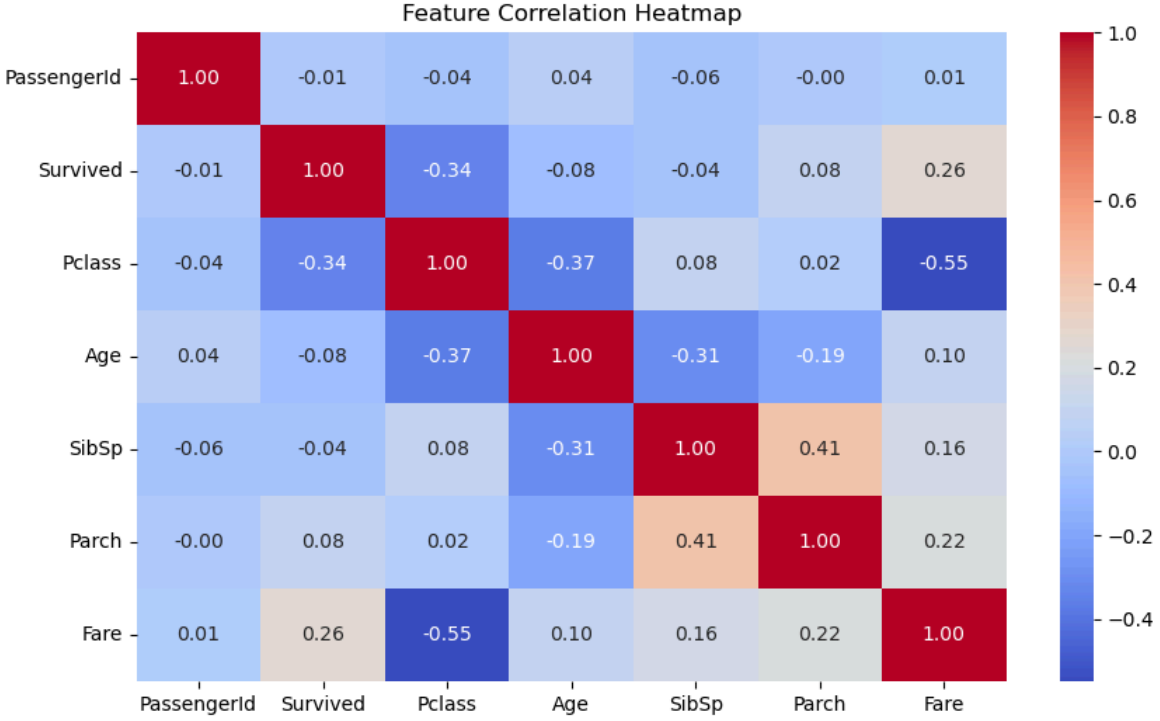
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   PassengerId  891 non-null    int64
 1   Survived     891 non-null    int64
 2   Pclass       891 non-null    int64
 3   Name         891 non-null    object
 4   Sex          891 non-null    object
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64
 7   Parch        891 non-null    int64
 8   Ticket       891 non-null    object
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object
 11  Embarked     889 non-null    object
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
None
       PassengerId    Survived      Pclass         Age       SibSp  \
count   891.000000  891.000000  891.000000  714.000000  891.000000
mean    446.000000    0.383838    2.308642   29.699118    0.523008
std     257.353842    0.486592    0.836071   14.526497    1.102743
min       1.000000    0.000000    1.000000    0.420000    0.000000
25%     223.500000    0.000000    2.000000   20.125000    0.000000
50%     446.000000    0.000000    3.000000   28.000000    0.000000
75%     668.500000    1.000000    3.000000   38.000000    1.000000
max     891.000000    1.000000    3.000000   80.000000    8.000000

            Parch        Fare
count  891.000000  891.000000
mean     0.381594   32.204208
std      0.806057   49.693429
min      0.000000    0.000000
25%      0.000000    7.910400
50%      0.000000   14.454200
75%      0.000000   31.000000
max      6.000000  512.329200
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
Survived
0    549
1    342
Name: count, dtype: int64
```

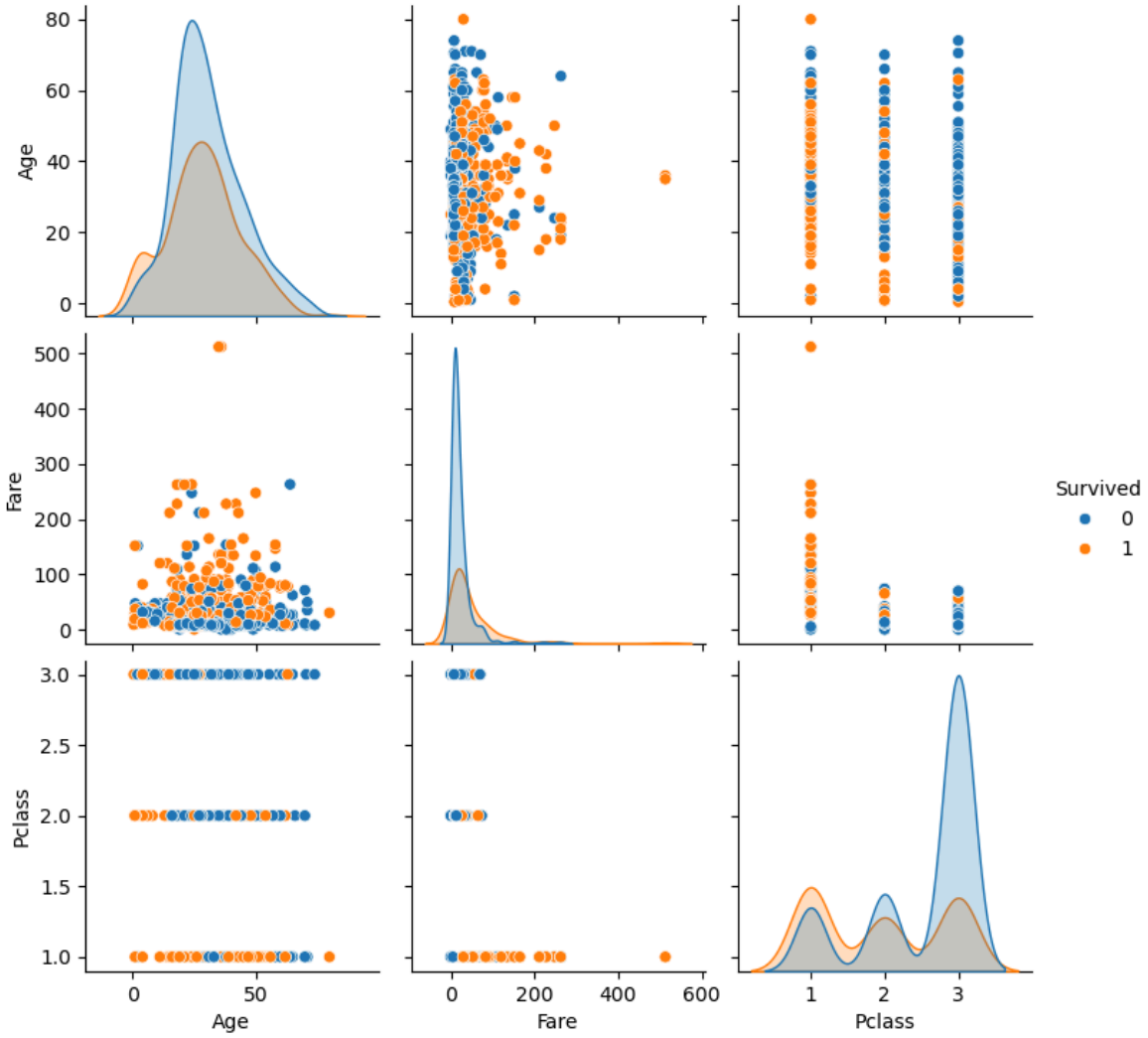

Age Distribution
Count
Age
0
10
20
30
40
50
60
70
80


Boxplot of Fare Prices
Fare
0
100
200
300
400
500



	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
0	1	0	3	22.0	1	0	7.2500
1	2	1	1	38.0	1	0	71.2833
2	3	1	3	26.0	0	0	7.9250
3	4	1	1	35.0	1	0	53.1000
4	5	0	3	35.0	0	0	8.0500





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